920476-904870

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE THE APPLICATION OF	)
Mark Gibson, et al.	) Examiner: Ian N. Moore
SERIAL NO. 09/751,058	) Group Art Unit No. 2661
FILED: December 29, 2000	) Customer number: 23644
FOR: Traffic Routing and Signalling in a Connectionless Communications Network	)

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450," on April 22, 2005.
Name of person signing Minnie Wilson
Signature Minnie Wilson

BRIEF ON APPEAL

Honorable Director of Patents and Trademarks
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This brief is being filed in view of the Examiner's final Office Action dated December 29, 2004. An appropriate Notice of Appeal, with Petition for Extension of Time, was submitted to the Patent and Trademark Office on March 2, 2005. This brief is therefore due to be submitted to the Patent and Trademark Office by May 2, 2005.

The appropriate fee of $500.00 pursuant to 37 C.F.R. §41.20(b) (2) is submitted herewith.

(i) Real Party in Interest

This application is assigned to Nortel Networks Limited. The assignment is recorded at Reel/Frame: 011703/0077.

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(ii) Related Appeals and Interferences

There are no related appeals or interferences.

(iii) **Status of Claims**

This application was filed with claims 1 through 23. During prosecution claims 1, 5, 6, 8 to 13, 17, 20, 21 & 23 were amended, claims 4, 7 & 14 to 16 were cancelled and claims 2, 3, 18, 19 & 22 retained as originally filed. Consequently, currently pending in the application are claims 1 to 3, 5, 6, 8 to 13 & 17 to 23. Claim 13 has been allowed, therefore it is the rejection of claims 1 to 3, 5, 6, 8 to 12 & 17 to 23 that is being appealed. The claims as currently pending are set forth in the Claims Appendix.

(iv) **Status of Amendments**

A paper entitled "Response to Office Action Mailed November 3, 2004 was filed December 29th 2004. This response to the final Office Action comprised amendment of claims 5, 6, 12 & 13 and cancellation of claims 4 & 15.

By an Advisory Action mailed January 25, 2005, the Examiner has maintained his rejection of claims 1 to 3, 5, 6, 8 to 12 & 17 to 23 on generally the same grounds as presented in the final Office Action of November 3, 2004, but has indicated that claim 13 is allowed. It is the continued rejection of claims 1 to 3, 5, 6, 8 to 12 & 17 to 23 that is being appealed.

(v) **Summary of the Claimed Subject Matter**

An increasing volume of communications traffic is being carried by packet networks, in particular Internet Protocol (IP) networks. In such networks the user traffic is contained in packets, each of which is provided with a header containing information whereby the packet is routed to its destination. A significant problem with IP networks is that of transporting high priority real time traffic, for example voice traffic, and of providing the quality of service guarantees that are currently being demanded.

A recent development in the communications field which addresses this issue has been the introduction of label switched networks, and in particular networks that operate via the multi-protocol label switching (MPLS) protocol. Such networks comprise an arrangement of routers and links in which quality of service tunnels are

defined. Packets are routed across the network by attaching label stacks to those packets indicative of the tunnels through which the packets will pass.

A particular problem that is being faced by network operators is the growth of networks in both complexity and size, and in the consequent difficulty of managing such networks. A potential solution to this problem is to partition a very large network into a number of autonomous domains or systems each of which operates substantially as an individual network. However, partitioning techniques employed have impaired the efficiency of current autodiscovery mechanisms. A possible approach to this problem is the use of dynamic partitioning. However, there is at present no mechanism for providing in an MPLS network a multi-layer switching capability that could provide this dynamic partitioning, i.e. the ability to define a label stack for MPLS such that aspects of hierarchy can be hidden from switches operating at different layers.

The present invention addresses this problem by providing in one embodiment a method of routing traffic in a label switched packet network in which label switched paths (LSPs) are installed between nodes of the network, the method comprising defining and installing partial routes in the network, each partial route comprising at least two LSPs with a pre-installed cross-connection in a node at each end of the at least two LSPs such that an end-to-end route across the network can be defined as the concatenation of two of said partial routes.

Thus, the present invention enables an end-to-end path or route to be established across a label switched packet network through the concatenation of only two defined and (pre-)installed partial routes which makes more efficient use of label stacks to route packets over the network.

(vi) **Grounds of Rejection to be Reviewed on Appeal**

The following issues are presented, as reduced by the December 29, 2004 Response:

1. The rejection of claims 1, 17 & 23 under 35 U.S.C. §102(e) as being anticipated by Kodialam (US6538991);

2. The rejection of claims 2, 3, 5 & 18 to 22 under 35 U.S.C. §103(a) as being unpatentable over Kodialam (US6538991) in view of Ebata (US6708209);

3. The rejection of claims 6, 8, 9 & 11 under 35 U.S.C. §103(a) as being unpatentable over Kodialam (US6538991) in view of Chuah (US6408001);

4. The rejection of claim 10 under 35 U.S.C. §103(a) as being unpatentable over Kodialam (US6538991) in view of Chuah (US6408001) and further in view of Ebata (US6708209); and

5. The rejection of claim 12 under 35 U.S.C. §103(a) as being unpatentable over Kodialam (US6538991) in view of Donovan (US6366577).

(vii) **Argument**

In order to place the Examiner's objections under both 35 U.S.C. §§102(e) and 103(a) in context with respect to independent claims 1, 6, 12, 17 & 23, it is necessary to consider what Kodialam et al (US6538991) actually discloses and suggests.

Kodialam concerns a method of routing a new NTP (network tunnel path) request based on network topology (column 5, lines 13/14). This employs a constraint based method that determines a path, such as a LSP (label switched path), through a network for an NTP request (column 4, lines 51 to 56). Sources S1, S2 etc connected to edge nodes of the network generate new packets for new or currently provisioned LSPs that identify ingress-egress point pairs. The ingress points comprise the edge nodes to which sources S1, S2 etc delivers packets and the egress points comprise edge nodes to which destinations D1, D2 etc are connected to receive such packets (column 5, lines 51 to 64). Thus an ingress-egress point pair define a path across the network from an edge node servicing a source S1, S2 etc to an edge node servicing a destination D1, D2 etc. It will also be clearly understood from Kodialam that a path (LSP, NTP) comprises a serial concatenation of links between adjacent nodes. It will also be clearly understood by a skilled addressee that a link is a network connection between two adjacent nodes but that a path is a concatenated series of links between a series of adjacent nodes. By consequence, an LSP for an NTP must comprise an edge to edge (end to end)

path across the network and this limitation of the teaching of Kodialam is more apparent from the following.

In Kodialam, a request for a NTP arrives at the network to provision and route a path between an ingress point and an egress point (column 6, lines 18/19). Thus, it follows that a request is for an end to end path between an edge node servicing a source and an edge node servicing a destination. Routing in accordance with the teaching of Kodialam evaluates the requested LSP (for the NTP) for a set of potential paths between ingress-egress point pairs (column 6, lines 40 to 49). In the method depicted by figure 4 of Kodialam, each potential path is tested and, if the test is passed, the path for the new LSP is provided including links, service level etc (column 8, lines 8 to 26). Thus, it can be seen that Kodialam teaches the evaluation of a number of potential end to end paths for each NTP request based on an ingress-egress point pair.

Referring to figure 6 of Kodialam and Table 1 (column 11, lines 16 to 44), it can be seen that a comparison is being provided of a number of paths allocated in accordance with a prior art minimum number of hops algorithm and the constraint based method disclosed by Kodialam. It is very clear that every path evaluated for the comparison as set out in Table 1 is a complete end to end path between edge nodes. There is no disclosure or suggestion that the processing of an NTP request in accordance with either the prior art minimum hops algorithm or the constraint based method of Kodialam involves evaluating paths that are not end to end paths across the network. Thus, it is clear that, in Kodialam, an NTP request results in a path evaluation process whereby candidate paths to satisfy the request are defined as end to end paths comprising a series of concatenated links between adjacent nodes starting with an edge node that services a source and ending with an end node servicing a destination.

Thus, there is no teaching or suggestion in Kodialam of defining and installing partial routes nor of forming an end to end path by concatenating two such installed and defined partial routes, where each defined and installed partial route comprises at least two LSPs with a pre-installed cross-connection. The present invention uses source based routing to effect control of the pre-installed cross-connections to link the partial routes together, and not just their constituent LSPs alone as is the case in Kodialam.

In justifying his 35 U.S.C. §102 rejection of claim 1, for example, the Examiner refers to figure 6 of Kodialam as showing a first route comprising N1-N4-N9-N10 and a second route N10-N11-N13 and to Table 1 and suggests that the concatenation of these two routes to form an end to end route across the network anticipates the method of claim 1. The applicants are entitled to ask where in Kodialam does it teach that route N1-N4-N9-N10 is separately defined and installed from the second route N10-N11-N13 prior to receipt of a request as is implicit in claim 1 of the present invention and that, in response to receipt of said request, these two partial routes are then concatenated to form an end to end path? No such teaching or suggestion exists since the arbitrarily selected first and second routes identified by the Examiner do not exist prior to an NTP request being received and never exist at all since the mechanics of forming a path in the system of Kodialam results in a path being formed as a serial concatenation of links between adjacent nodes starting at a source edge node and ending with a destination edge node.

Since all of the Examiner's various rejections of claims 1 to 3, 5, 6, 8 to 12 & 17 to 23 as identified by issues 1 to 5 above are predicated on the misconstruction of the teaching of Kodialam then such rejections cannot be sustained against any of said claims. Also, since the issuance of the final office action mailed on November 3, 2004 resulted from the misconstruction of the teaching of Kodialam, the finality of the office action should not have been made to the disadvantage of the applicant.

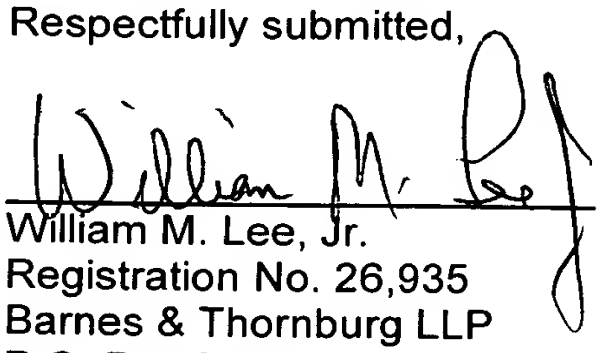
In the Advisory Office Action mailed on January 25, 2005, the Examiner repeats his assertion that Kodialam teaches the feature of "defining and installing partial routes". However, as addressed above, this assertion by the Examiner was fully responded to in the applicants' response to the Final Office Action. As such, the re-assertion by the Examiner of his previously presented position does not properly address the arguments presented by the applicant, particularly since the Examiner has been unable to deny the validity of the applicants' previous submission on this important point and has thus sought to maintain his rejections of claims 1 to 3, 5, 6, 8 to 12 & 17 to 23 by merely re-asserting his position without substantiation. That clearly is improper.

The present invention makes a useful contribution to the art since it enables an end to end path or route to be established across a label switched packet network through the concatenation of only two defined and (pre-)installed partial routes which makes more efficient use of label stacks to route packets over the network.

It is therefore requested that the Examiner be reversed with an indication that claims 1 to 3, 5, 6, 8 to 12 & 17 to 23 are to be allowed in addition to claim 13 which is already allowed.

April 22, 2005

Respectfully submitted,



William M. Lee, Jr.
Registration No. 26,935
Barnes & Thornburg LLP
P.O. Box 2786
Chicago, Illinois 60690-2786
(312) 214-4800
(312) 759-5646 (fax)

CLAIMS APPENDIX

Claims

1. A method of routing traffic in a label switched packet network in which label switched paths (LSPs) are installed between nodes of the network, the method comprising defining and installing partial routes in the network, each partial route comprising at least two LSPs with a pre-installed cross-connection in a node at each end of the at least two LSPs such that an end-to-end route across the network can be defined as the concatenation of two of said partial routes.

2. A method as claimed in claim 1, wherein said network is partitioned into a plurality of autonomous system regions.

3. A method as claimed in claim 2, wherein the partial routes are selected based on congestion measurements.

4. (cancelled)

5. A method as claimed in claim 1, wherein said LSPs and partial routes are installed via a common open policy service protocol.

6. A method of operating a multi-protocol label switched packet network, the method comprising partitioning the network by using constraint based routing to install label switched paths (LSPs) between nodes of the network; defining and installing partial routes in the network, each partial route comprising at least two LSPs with a pre-installed cross-connection in a node at each end of the at least two LSPs; wherein a label stack installed at an edge of the network acts as a source route such that the pre-installed cross connections enable dynamic multiplexing of sessions into the LSPs at a higher label level.

7. (cancelled)

8. A method as claimed in claim 6, wherein the partial routes are selected based on congestion measurements.

9. A method as claimed in claim 8, wherein said partial routes include cross connections in label switching nodes.

10. A method as claimed in claim 9, wherein said LSPs and partial routes are installed via a common open policy service protocol.

11. A method as claimed in claim 6, and embodied as software in machine readable form on a storage medium.

12. A method of signalling to provide routing in a multi-protocol label switched packet network, the method comprising; sending a path message from an end point to a first virtual router; determining a first half path from the first virtual router across the network towards a second virtual router; forwarding an identity of said first half path to the second virtual router; determining a second half path across the network which together with the first half path defines a path across the network between the first and second virtual routers; determining a routing vector for said path across the network; and returning information identifying said routing vector to the first virtual router, wherein each of said half paths comprises a partial route installed in the network, each partial route comprising at least two label switched paths (LSPs) with a pre-installed cross-connection in a node at each end of the at least two LSPs.

13. A method of signalling to establish an end to end path in a multi-protocol label switched packet network, the method comprising sending a path message from an end point to a first virtual router; encapsulating the path message within a resource reservation protocol (RSVP) message and transmitting the RSVP message to a second virtual router, said path information being carried within a RSVP policy element in said RSVP message; determining a second half path across the network towards the second virtual router; determining routing vector information for said second half path; communicating said vector information to the first virtual router; determining a first half path which together with the second half path defines a path across the network between the first and second virtual routers; wherein each of said half paths comprises a partial route installed in the network, each partial route comprising at least two label switched paths (LSPs) with a pre-installed cross-connection in a node at each end of the at least two LSPs.

14. (cancelled)

15. (cancelled).

16. (cancelled).

17. A label switched communications packet network in which label switched paths (LSPs) are installed between nodes of the network, the network including path selection means for defining and installing partial routes in the network, each partial route comprising at least two LSPs with a pre-installed cross-connection in a node at each end of the at least two LSPs such that an end-to-end route across the network can be defined as the concatenation of two of said partial routes.

18. A packet network as claimed in claim 17, wherein said network is partitioned into a plurality of autonomous system regions.

19. A packet network as claimed in claim 18, wherein the partial routes are selected based on congestion measurements.

20. A packet network as claimed in claim 19, wherein said partial routes include cross connections in label switching nodes.

21. A packet network as claimed in claim 20, wherein said LSPs and partial routes are installed via a common open policy service protocol.

22. A packet network as claimed in claim 21, and incorporating signalling means for sending path reservation requests as tunnelled resource reservation protocol (RSVP) messages between first and second virtual routers.

23. A virtual router embodied as software in machine readable form on a storage medium and arranged to route traffic in a packet network in which label switched paths are installed between nodes of the network, the software being arranged to define and install partial routes in the network, each partial route comprising at least two LSPs with a pre-installed cross-connection in a node at each end of the at least two LSPs such that an end-to-end route

across the network can be defined as the concatenation of two of said partial routes.